

## Highway profiling

Ride quality on highways (and railways) may be improved by Marshall Space Flight Center's adaptations of gyro-stabilized spacecraft guidance and control systems.

The Marshall work indicates that currently used instruments for profiling roadways may be enhanced by the addition of a stable three-axis platform-type inertial reference. The platform system can measure banks, bumps, curves, grades, elevations, speeds, and distances, and even can measure the distribution of roadway undulations. Appropriate computer programs then can be written to answer future questions concerning the roadbed.

Such a roadway measuring system can make a significant contribution to the safety and maintainability of roadways. Marshall now has selected a vehicle to carry the instrument and is in the process of devising a test program for a prototype to be built soon.

## Bearing-failure detection

Technology derived by NASA for monitoring control gyros in the Skylab program is directly applicable to the problems of fault detection of railroad wheel bearings. The railroad industry currently is

changing over from journal bearings to roller bearings for greater safety.

About half of some 2-million railcars in the country now are equipped with roller bearings and all will be by 1980. Many of the 500 annual derailments in the U.S., costing more than \$10-million, are caused by bearing failures.

Roller bearings don't have a long temperature rise prior to failure, as do the older journal bearings, so fast detection becomes more important.

Marshall scientists have developed a detection concept based on the fact that bearing defects themselves excite the resonant frequency of the rolling elements of the bearing as they impact the defect. By detecting the resonant frequency and subsequently analyzing the character of this signal, bearing defects may be detected and identified as to source.

Shaker Research Corp., Latham, N.Y., now is developing a commercial version of this device under a cost-shared contract with NASA.

*A test vehicle measures the resonant frequency of railroad roller bearings to identify the source of bearing defects. A spinoff from instrumentation devised to monitor control gyros, the bearing-fault detector will help eliminate this cause of derailments.*

